



Environmental and Safety Designs, Inc.

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August 29, 1991

Subject: COLLIERVILLE (TN) SITE SOILS REMEDIATION

Dear Mr. Neptune:

Sorry for the delay in filling your request for the enclosed RI Report. In an effort to show you the basis for our analysis of soil remediation alternatives, also enclosed is some excerpts from the Draft FS currently being produced. Please note that this information is being supplied without full internal, or client review. Please call once you have an opportunity to this material. We will be happy to discuss questions, and comments that result. The draft FS is nearing completion, and does include, as we discussed, consideration of the sampling requirements associated with each alternative.

Best Regards,

Craig A. Wise
Chemical Engineer

copy: Beth Brown Region IV
Nelson Wong, Carrier

enclosure



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A. GENERAL RESPONSE ACTIONS

General Response Actions are media-specific, generic actions that may alone or in combination with other actions, achieve remedial action objectives. The following Table 2-8 summarizes objectives, general response actions and general quantities of media to which such actions must be applied:

TABLE 2-8. GENERAL RESPONSE ACTIONS AND APPLICABLE MEDIA			
MEDIA	REMEDIAL ACTION OBJECTIVE	GENERAL RESPONSE ACTION	INITIAL VOLUME/ AREA OF MEDIA
Groundwater	<u>For Human Health:</u> Prevent ingestion of Site groundwater having site contaminants in excess of MCLs.	No Action/ Institutional Controls	Shallow groundwater
		Containment Actions	Memphis Sands groundwater
	<u>For Environmental Protection:</u> Restore Memphis Sands groundwater to MCLs and ARARs.	Extraction/Treatment/ Disposal Actions	
Soil	<u>For Human Health:</u> Prevent direct contact/ingestion with soil having contaminant concentrations in excess of the reference dose or 10^{-4} to 10^{-6} excess cancer risk.	No Action/ Institutional Controls	Soils > 8000 $\mu\text{g/kg}$ TCE
		Containment Actions	
	<u>For Environmental Protection:</u> Prevent migration of contaminants which would result in Memphis Sands aquifer contamination in excess of MCLs and ARARs.	Excavation/Treatment Actions	Soils > 200 $\mu\text{g/kg}$ (for protection of groundwater)
		In-situ Treatment Actions	

Groundwater

The Memphis Sands aquifer, with a Darcy velocity of 8 ft/day and saturated thickness of about 500 feet, results in a groundwater flux in excess of 280 MGD past the affected main plant area. At this time insufficient data is available to assess the vertical extent of contamination in the Memphis Sand, but the plume has reached the zone of influence of the adjacent Town of Collierville well field, screened from 230 to 260 feet in the aquifer.

~~Estimation~~ of the volume of shallow groundwater affected by TCE releases is less readily estimated due to the apparent irregularities of the Jackson confining clay, and resultant perched zones. An estimate made for purposes of calculating soil remediation criteria that will be protective of the Memphis Sands Aquifer, is based on percolation of precipitation (less run off and evapotranspiration). The results of this estimate depend on assumptions for area subject to percolation through contaminated soils, and range from 12,800 to 31,100 gallons per day for the

entire site.

Soil

Soil contamination exists at the Collierville site in the source areas mentioned earlier in this report. Soils affected by TCE releases around the main plant area (1979 and 1985) are the subject of this discussion. Soils contaminated in the former lagoon area are being addressed in a soil vapor extraction treatability study. Around the plant, the following figures depict soil contamination levels, as measured by CLP volatile and screening method analyses of split-spoon soil boring samples from various depths. Rationale for location of borings was best professional judgement. Investigators were attempting to characterize impacts on underlying soil of liquid TCE and wash water from the spill. Figure A (0.5'-2.0'), Figure B (3.0-5.0'), and Figure C (0.5'-5.0') present analyses of progressively deeper soil samples. At each depth, an isopleth of contamination at the 8000 $\mu\text{g/kg}$ level was drawn by inspection of nearby boring data. The product of resulting areas and depth intervals yields the following volumes of soil contaminated at the 8000 $\mu\text{g/kg}$ threshold:

Table 2-9 Soil Volumes > 8000 $\mu\text{g/kg}$ TCE	
INTERVAL, ft	VOLUME, cubic yards
0-2	1000
2-5	500
0-5, including overburden	2600

Irregular spacing of borings make for some uncertainty in the extent of contamination at or above this contamination level, especially in the area between borings 4 and 14. However, the areas presented herein provide estimates of affected volume suitable for evaluation of alternatives.

For protection of groundwater, a lower contamination threshold, 200 $\mu\text{g/kg}$ TCE, much be reached. The volume of soils around the plant contaminated with TCE above this concentration was approximated in the same manner as 8000 $\mu\text{g/kg}$ soils. Figures D, E, F, and G present area of soils contaminated at the 200 $\mu\text{g/kg}$ level, at 0-5', 5'-10', 10'-15', and 15'-20' depths, respectively. Again, the exact extent of contamination is subject to interpretation of borings data, but contamination indicated from laboratory soils analyses agree with a field survey of soil gas, and accounts of the pathway of spill event run off. The following table lists depth intervals and contaminated soil volumes:

Table 2-10 Soil Volumes > 200 $\mu\text{g/kg}$ TCE	
INTERVAL, ft	VOLUME, cubic yards
0-5	17,200
5-10	17,800
10-15	21,400
15-20	18,500

B. IDENTIFICATION AND SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS